

impacts of various pollution sources. The level of resources in terms of sampling and analytical effort redirected from the receiving water monitoring program required under section IV of the MRP (Attachment E) shall approximately equal the level of resources provided to implement the regional monitoring and assessment program, unless the San Diego Water Board and the Discharger agree otherwise. The specific scope and duration of the receiving water monitoring program reallocation and redirection shall be determined and set by the San Diego Water Board, in consultation with the Discharger. Refer to section V.B of the MRP (Attachment E).

4. Discharge Monitoring Report – Quality Assurance (DMR-QA) Study Program

Under the authority of section 308 of the CWA (33 U.S.C. section 1318), U.S. EPA requires major and selected minor permittees under the NPDES Program to participate in the annual DMR-QA Study Program. The DMR-QA Study Program evaluates the analytical ability of laboratories that routinely perform or support self-monitoring analyses required by NPDES permits. There are two options to satisfy the requirements of the DMR-QA Study Program: (1) the Discharger can obtain and analyze a DMR-QA sample as part of the DMR-QA Study; or (2) per the waiver issued by U.S. EPA to the State Water Board, the Discharger can submit the results of the most recent Water Pollution Performance Evaluation Study from its own laboratories or its contract laboratories. A Water Pollution Performance Evaluation Study is similar to the DMR-QA Study. Thus, it also evaluates a laboratory's ability to analyze wastewater samples to produce quality data that ensures the integrity of the NPDES Program. The Discharger shall ensure that the results of the DMR-QA Study or the results of the most recent Water Pollution Performance Evaluation Study are submitted annually to the State Water Board. The State Water Board's Quality Assurance Program Officer will send the DMR-QA Study results or the results of the most recent Water Pollution Performance Evaluation Study to U.S. EPA's DMR-QA Coordinator and Quality Assurance Manager.

D. Other Monitoring Requirements

1. Thermal Plume Monitoring

Thermal Plume Monitoring has not been carried over from Order No. R9-2006-0065. A review of effluent monitoring data demonstrated that the Facility does not appreciably add thermal energy (i.e. increase temperature) to the discharge and no longer requires thermal plume monitoring.

VIII. PUBLIC PARTICIPATION

The San Diego Water Board has considered the issuance of WDRs that will serve as an NPDES permit for the Facility. As a step in the WDR adoption process, the San Diego Water Board staff developed a Tentative Order and encouraged public participation in the proceedings to consider adoption of the Tentative Order in accordance with the requirements of 40 CFR section 124.10 and Water Code section 13167.5.

A. Notification of Interested Parties

The San Diego Water Board notified the Discharger and interested agencies and persons of its intent to prescribe WDR's for the discharge and provided an opportunity to submit written comments and recommendations. By electronic mail dated December 21, 2018, the San

Diego Water Board notified the Discharger and interested agencies and persons of its intent to consider adoption of the tentative WDRs and of its intent to conduct a public hearing during a regularly scheduled San Diego Water Board meeting on March 13, 2019. The San Diego Water Board also provided notice that the Tentative Order was posted on the San Diego Water Board website and provided a period of at least 30 days for public review and comment. On December 21, 2018 notice of the public hearing and public comment period was also published in the San Diego Union Tribune, a daily newspaper within the area affected by the Facility. The public also had access to the agenda and any changes in dates and locations through the San Diego Water Board's web site at: <http://www.waterboards.ca.gov/sandiego/>

B. Written Comments

Interested persons were invited to submit written comments concerning tentative WDRs as provided through the notification process. Comments were due either in person or by mail to the Executive Office at the San Diego Water Board at 2375 Northside Drive, Suite 100, San Diego, CA 92108.

To be fully responded to by staff and considered by the San Diego Water Board, the written comments were due at the San Diego Water Board office by 5:00 PM on January 28, 2018. The San Diego Water Board provided written responses to all timely received public comments on the Tentative Order and posted the response to comments document on the Board's website in advance of the public hearing date

C. Public Hearing

The San Diego Water Board held a public hearing on the Tentative Order during its regular Board meeting on the following date and time and at the following location:

Date: Wednesday, March 13, 2019
Time: 9:00 AM
Location: San Diego Water Board
San Diego Water Board Meeting Room
2375 Northside Drive, Suite 100
San Diego, CA 92108

Interested persons were invited to attend the public hearing. At the public hearing, the San Diego Water Board heard testimony pertinent to the discharge and the Tentative Order. For accuracy of the record, important testimony was requested in writing.

D. Reconsideration of Waste Discharge Requirements

Any aggrieved person aggrieved by this action of the San Diego Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., within 30 calendar days of the San Diego Water Board taking action, at the following address except that if the thirtieth day falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day:

Petitions may be sent as follows

By Mail:

State Water Resources Control Board
Office of Chief Counsel
P.O. Box 100, 1001 I Street
Sacramento, CA 95812-0100

In Person:

State Water Resources Control Board
Office of Chief Counsel
1001 "I" Street
Sacramento, CA 95814

By email at:

waterqualitypetitions@waterboards.ca.gov

By Fax:

(916) 341-5199

For instructions on how to file a petition for review, see:

http://www.waterboards.ca.gov/public_notices/petitions/water_quality/wqpetition_instr.shtml

E. Information and Copying

The ROWD, other supporting documents, and comments received on the Tentative Order are on file and may be inspected at the address above at any time between 8:00 a.m. and 5:00 p.m., Monday through Friday, except for State holidays. Copying of documents may be arranged through the San Diego Water Board by calling (619) 516-1990.

The San Diego Water Board website contains information and instructions on how to request access and obtain copies of these documents at:

http://www.waterboards.ca.gov/sandiego/about_us/contact_us/records.shtml

Before making a request to view public records in the San Diego Water Board office, interested persons may wish to determine if the information is already available on the San Diego Water Board website at <http://www.waterboards.ca.gov/sandiego/>

F. Register of Interested Parties

Any person interested in being placed on the mailing list for information regarding the WDRs and NPDES permit should contact the San Diego Water Board at the address below, reference this Facility, and provide a name, address, email address (if available) and phone number.

2375 Northside Drive, Suite 100
San Diego, CA 92108-2700
Phone (619) 516-1990
Fax (619) 516-1994
rb9_questions@waterboards.ca.gov

G. Additional Information

Requests for additional information or questions regarding this order should be directed to Ben Neill at ben.neill@waterboards.ca.gov or 619-521-1990.

ATTACHMENT G – OCEAN PLAN AND BASIN PLAN PROHIBITIONS

I. Ocean Plan Discharge Prohibitions

- A. The Discharge of any radiological chemical, or biological warfare agent or high-level radioactive waste into the ocean is prohibited.
- B. Waste shall not be discharged to designated Areas of Special Biological Significance except as provided in chapter III.E of the Ocean Plan.
- C. Pipeline discharge of sludge to the ocean is prohibited by federal law; the discharge of municipal and industrial waste sludge directly to the ocean, or into a waste stream that discharges to the ocean, is prohibited. The discharge of sludge digester supernatant directly to the ocean, or to a waste stream that discharges to the ocean without further treatment, is prohibited.
- D. The by-passing of untreated wastes containing concentrations of pollutants in excess of those of Table 2 or Table 1 of the Ocean Plan is prohibited.

II. Basin Plan Discharge Prohibitions

- A. The discharge of waste to waters of the State in a manner causing, or threatening to cause a condition of pollution, contamination, or nuisance as defined in Water Code section 13050, is prohibited.
- B. The discharge of waste to land, except as authorized by WDR's or the terms described in Water Code section 13264 is prohibited.
- C. The discharge of pollutants or dredged or fill material to waters of the U.S. except as authorized by an NPDES permit or a dredged or fill material permit (subject to the exemption described in Water Code section 13376) is prohibited.
- D. Discharges of recycled water to lakes or reservoirs used for municipal water supply or to inland surface water tributaries thereto are prohibited, unless this San Diego Water Board issues an NPDES permit authorizing such a discharge; the proposed discharge has been approved by the State of California Department of Public Health and the operating agency of the impacted reservoir; and the discharger has an approved fail-safe long-term disposal alternative.
- E. The discharge of waste to inland surface waters, except in cases where the quality of the discharge complies with applicable receiving water quality objectives, is prohibited. Allowances for dilution may be made at the discretion of the San Diego Water Board. Consideration would include streamflow data, the degree of treatment provided and safety measures to ensure reliability of facility performance. As an example, discharge of secondary effluent would probably be permitted if streamflow provided 100:1 dilution capability.
- F. The discharge of waste in a manner causing flow, ponding, or surfacing on lands not owned or under the control of the discharger is prohibited, unless the discharge is authorized by the San Diego Water Board.

- G. The dumping, deposition, or discharge of waste directly into waters of the State, or adjacent to such waters in any manner which may permit it's being transported into the waters, is prohibited unless authorized by the San Diego Water Board.
- H. Any discharge to a storm water conveyance system that is not composed entirely of storm water is prohibited unless authorized by the San Diego Water Board. [The federal regulations, 40 CFR section 122.26(b)(13), define storm water as storm water runoff, snow melt runoff, and surface runoff and drainage. 40 CFR section 122.26(b)(2) defines an illicit discharge as any discharge to a storm water conveyance system that is not composed entirely of storm water except discharges pursuant to an NPDES permit and discharges resulting from firefighting activities.] [section 122.26 amended at 56 FR 56553, November 5, 1991; 57 FR 11412, April 2, 1992].
- I. The unauthorized discharge of treated or untreated sewage to waters of the State or to a storm water conveyance system is prohibited.
- J. The discharge of industrial wastes to conventional septic tank/ subsurface disposal systems, except as authorized by the terms described in Water Code section 13264, is prohibited.
- K. The discharge of radioactive wastes amenable to alternative methods of disposal into the waters of the State is prohibited.
- L. The discharge of any radiological, chemical, or biological warfare agent into waters of the State is prohibited.
- M. The discharge of waste into a natural or excavated site below historic water levels is prohibited unless the discharge is authorized by the San Diego Water Board.
- N. The discharge of sand, silt, clay, or other earthen materials from any activity, including land grading and construction, in quantities which cause deleterious bottom deposits, turbidity or discoloration in waters of the State or which unreasonably affect, or threaten to affect, beneficial uses of such waters is prohibited.

**ATTACHMENTS H.1 & H.2 – OCEAN PLAN DECISION MATRIX AND WATER CODE 13142.5(B)
EVALUATION**

Attachment H.1 – California Water Code Section 13142.5(b) Determination for Permanent Stand-alone Operations

Poseidon Resources (Channelside) LP (Poseidon or Discharger) is the owner and operator of the Carlsbad Desalination Project (CDP or Facility). The CDP was formerly co-located with the Encina Power Station (EPS), a power plant owned and operated by Cabrillo Power I LLC (Cabrillo). The EPS withdraws water from the Agua Hedionda Lagoon in Carlsbad, California for cooling water through the existing EPS intake structure.

The former co-located CDP operation withdrew source water through the existing EPS discharge structure. The CDP used up to 114 million gallons per day (MGD) of cooling water from the EPS as source water to produce up to 54 MGD of potable drinking water for the San Diego County Water Authority (SDCWA). The remaining 60 MGD of brine waste from the desalination process and other wastewater from the CDP were commingled with the remaining cooling water from the EPS and discharged to the Pacific Ocean. The EPS terminated power generation operations on December 11, 2018. At that time, the CDP commenced withdrawing water from Agua Hedionda Lagoon under stand-alone conditions for its own purposes.

Under the current stand-alone operations as regulated under this Order, CDP intakes source seawater from Agua Hedionda lagoon at a flowrate of 299 MGD. 127 MGD of the source water will be used to produce up to 60 MGD of potable water. The remaining water that is not used for potable water production will be used to dilute the brine wastewater and other wastewater flows for Poseidon to meet the discharge salinity requirements of this Order. The discharge flow rate will vary in accordance with CDP operations. For example, at 50 MGD of potable water production, the discharge flow rate is 249 MGD (54 MGD of wastewater with 195 MGD of dilution water). At 60 MGD of potable water production, the discharge flow rate is 239 MGD (67 MGD of wastewater and 172 MGD of dilution water) into the Pacific Ocean.

California Water Code (Water Code) section 13142.5, subdivision (b) (hereafter Water Code section 13142.5(b)) provides that "For each new or expanded coastal powerplant or other industrial installation using seawater for cooling, heating, or industrial processing, the best available site, design, technology, and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life."

The San Diego Water Board adopted Order No. R9-2009-0038 (2009 Determination¹) on May 13, 2009 amending the National Pollutant Discharge Elimination System (NPDES) Permit, Order No. R9-2006-0065, finding that the CDP complied with Water Code section 13142.5(b) for co-located operations and temporary stand-alone operations. The 2009 Determination concluded that if the EPS permanently ceases power generation operations and Poseidon proposes to independently operate the existing EPS seawater intake and outfall for the benefit of the CDP ("stand-alone operation"), it will be necessary to evaluate whether, under those conditions, the CDP complies with the requirements of Water Code section 13142.5(b) for permanent stand-alone operating conditions. The 2009 Determination also required Poseidon to

¹ Order No. R9-2009-0038 is available on the San Diego Water Board website at: https://www.waterboards.ca.gov/sandiego/board_decisions/adopted_orders/R9-2009-0038.pdf (as of November 15, 2018).

construct 55.4 acres of wetland mitigation to compensate for the intake, entrainment, and mortality of all forms of marine life resulting from co-located and temporary stand-alone CDP operations. The 2009 Determination established a biological performance standard of fish productivity (i.e., the production of new fish biomass) of 1,715.5 kg/year to be achieved in the wetlands mitigation site.

Subsequently, Poseidon reached agreement with the California Coastal Commission (Coastal Commission) to increase the wetland mitigation area to 66.4 acres as a condition of the Commission's Coastal Development Permit. On September 29, 2010, Poseidon and the U.S. Fish and Wildlife Service's (USFWS) San Diego Bay National Wildlife Refuge (NWR) entered into a memorandum of understanding to establish a partnership to facilitate restoration of tidal wetlands in the Otay River Floodplain and an active solar salt pond site (Pond 15) within the San Diego Bay NWR.² The restoration project is referred to as the "Otay River Estuary Restoration Project." Poseidon proposes to fund and implement the Otay River Estuary Restoration Project to fulfill the mitigation requirements imposed by the Coastal Commission's 2007 Coastal Development Permit and the San Diego Water Board's 2009 Determination.

On May 6, 2015, the State Water Resources Control Board (State Water Board) adopted the *Amendment to the Water Quality Control Plan for Ocean Waters of California (Ocean Plan) Addressing Desalination Facility Intakes, Brine Discharges, and the Incorporation of Other Non-substantive Changes* (Desalination Amendment). The Desalination Amendment provides specific direction to regional water boards for making Water Code section 13142.5(b) determinations when permitting new or expanded seawater desalination facilities to ensure a consistent statewide approach for minimizing intake and mortality of marine life and protecting water quality and related beneficial uses of ocean waters at and near desalination facilities. The San Diego Water Board's role in making the Water Code section 13142.5(b) determination is to evaluate a range of feasible³ alternatives for the best available site, design, technology, and mitigation measures to minimize intake and mortality of all forms of marine life and then to determine the best combination of feasible alternatives to minimize intake and mortality of all forms of marine life. (Ocean Plan chapter III.M.2.a(2).)

On September 4, 2015, Poseidon submitted a request for a Water Code section 13142.5(b) determination for permanent stand-alone operating conditions. Poseidon submitted additional information to supplement the Report of Waste Discharge (ROWD), in the form of technical memos, studies, and other reports, on multiple dates. For example, on October 22, 2018, Poseidon submitted a letter stating that it supports and proposes to implement Design Alternative 21. On November 19, 2018, Poseidon submitted a letter that describes the new

² Additional information regarding the Otay River Estuary Restoration Project is available on the U.S. Fish and Wildlife Service website at https://www.fws.gov/refuge/San_Diego_Bay/what_we_do/Resource_Management/Otay_Restoration/Otay_River_Estuary_Restoration_Project.html (as of June 25, 2018)

³ The Ocean Plan provides in Appendix I that "feasible" for the purposes of Chapter III.M of the Ocean Plan means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors.

intake pumps. Table H-1 lists the appendices to the ROWD. The table does not include correspondence such as the October 22, 2018 and November 19, 2018 letters⁴.

Table H-1. Appendices to the ROWD

Appendix Letter	Appendix Title	Date Submitted
A	Compliance with Ocean Plan Amendments (Errata in Appendix JJ below)	September 4, 2015
B	Intake Discharge Feasibility Report (Addendum in Appendix II below)	September 4, 2015
C	Hydrodynamic Discharge Study	September 4, 2015
D	Coastal Process Effects of Reduced Intake	September 4, 2015
E	NPDES Order No. R9-2011-0028	September 4, 2015
F	Water Circulation in Agua Hedionda Lagoon	September 4, 2015
G	Acute Toxicity Study	September 4, 2015
H	Chronic Toxicity Study	September 4, 2015
I	Brine Dilution Salinity Tolerance	September 4, 2015
J	Fish-Friendly Pumping	September 4, 2015
K	Intake/Discharge Entrainment Analysis	September 4, 2015
L	CFD Modeling of Flow Augmentation System	September 4, 2015
M	Antidegradation Analysis	September 4, 2015
N	Life Cycle Cost Analysis (Revised in Appendix OO below)	September 4, 2015
O	NPDES Order No. R9-2009-0038	September 4, 2015
P	Flow, Entrainment, Impingement Minimization Plan	September 4, 2015
Q	Final EIR	September 4, 2015
R	California Coastal Commission Approval of Marine Life Mitigation Plan	September 4, 2015
S	Hydrogeologic Investigation SDG&E Encina Power Plant, Carlsbad, CA	September 4, 2015
T	Drought Proofing Through Desalting the SDG&E Approach	September 4, 2015
U	Huntington Beach Desalination Project, ISTAP Phase I & II Reports	September 4, 2015
V	U.S. Fish and Wildlife Service MOU	September 4, 2015
W	SDCWA 2010 Urban Water Management Plan and 2013 Facilities Master Plan Update	September 4, 2015
X	Construction Cost Estimates for Intake/Discharge Alternatives	September 4, 2015
Y	Implementation Schedules for Intake/Discharge Alternatives	September 4, 2015
Z	Proposed Monitoring and Reporting Plan	September 4, 2015
AA	California Coastal Commission Approval of CDP	August 18, 2016
BB	Revised Hydrodynamic Discharge Modeling Report	August 18, 2016
CC	Encina Wastewater Authority Response to Request for Information regarding the Encina Ocean Outfall as a Brine Discharge Alternative for the Carlsbad Desalination Plant	August 18, 2016
DD	Analysis of Potential for CDP Discharge to Cause Hypoxic Conditions	August 18, 2016
EE	Comparison of Fish Return Options	August 18, 2016
FF	Fish Return System Cleaning Methods	August 18, 2016
GG	Larval Fish Residence Time in Agua Hedionda Lagoon	August 18, 2016
HH	Entrapment Evaluation	August 18, 2016
II	Addendum to Intake Discharge Feasibility Report	August 18, 2016

⁴Significant correspondence with Poseidon is available at the San Diego Water Board's website:
https://www.waterboards.ca.gov/sandiego/water_issues/programs/regulatory/carlsbad_desalination.html

Appendix Letter	Appendix Title	Date Submitted
JJ	Appendix A Errata	August 18, 2016
KK	Draft Final SEIR	August 18, 2016
LL	Draft Response to Comments	August 18, 2016
MM	Draft Findings of Fact	August 18, 2016
NN	Draft Mitigation Monitoring and Reporting Program	August 18, 2016
OO	Revised Life Cycle Cost Analysis	August 18, 2016
PP	Intake/Discharge Design Modifications	August 18, 2016
QQ	Response to Questions Regarding CDP Discharge Modeling Reports (Revised February 21, 2017)	February 21, 2017
RR	Feasibility Assessment of Alternative Brine Discharge to the Encina Ocean Outfall	October 31, 2016
SS	Feasibility Assessment of Wedge-wire Screen (WWS) Intake in Agua Hedionda Lagoon	October 31, 2016
TT	Fish Return System Discharge Location Alternatives Analysis	October 31, 2016
UU	Brine Mixing Zone Habitat Assessment (Revised January 18, 2017)	January 18, 2017
VV	Establishing the Location of the Zone of Initial Dilution for Stand-Alone Operation (Revised March 14, 2017)	March 14, 2017
WW	Brine Discharge Mortality Calculations	January 30, 2017
XX	Current and 2065 Area BMZ and Wetlands Restoration Project	January 30, 2017
YY	Marine Life Mortality Comparison between the Proposed Screening Location and the Lagoon Screen Locations	January 30, 2017
ZZ	Marine Life Mortality Report and Mitigation Calculation (Rev. 1)	April 11, 2017
AAA	Fish Return Antidegradation	April 11, 2017
BBB	Evaluation of Intake Alternatives 1, 15-20	April 11, 2017
CCC	Evaluation of Intake Alternatives 1, 11-14	April 11, 2017
DDD	Feasibility Assessment of Carlsbad Desalination Plant Intake and Discharge	November 20, 2017
EEE	Revised Feasibility Assessment for Intake Alternatives 1, 15, and 21	April 4, 2018
FFF	Revised APF Calculations	May 31, 2018
GGG	Revised Entrainment Analysis for Brine Discharge Options	December 14, 2018
HHH	Relative Salinity Impacts in the Brine Mixing Zone (BMZ) of the Carlsbad Desalination Plant (CDP) for Variable Discharge Rates	December 18, 2018

The ROWD, including all appendices and the request for a Water Code section 13142.5(b) determination for permanent stand-alone operating conditions and information submitted in support of this request, can be found on the San Diego Water Board website at: https://www.waterboards.ca.gov/sandiego/water_issues/programs/regulatory/carlsbad_desalination.html. All documents, data, correspondence and other materials that are identified in this Attachment H.1 are incorporated herein by this reference and made part of the record hereto.

Chapter III.M.1(a)(1) of the Ocean Plan authorizes the San Diego Water Board to require Poseidon, as owner and operator of the CDP, to hire a neutral third-party entity to review studies and models and make recommendations to the San Diego Water Board for consideration in developing the Water Code section 13142.5 determination. Following discussions with Poseidon, a Science Advisory Panel (SAP), previously convened by the Coastal Commission, was selected to conduct the neutral third-party review of studies and models and make recommendations to the San Diego Water Board. The SAP first convened on June 21, 2018 and submitted a final report on September 15, 2018. The SAP reviewed topics regarding the biological performance standard for mitigation; mitigating for mortality to all forms

of marine life; and comparing the intake and mortality of all forms of marine life associated with various alternative intake screen locations.⁵ The SAP recommendations in summary are:

- 1) The San Diego Water Board's biological performance standard of fish productivity (i.e. the production of new fish biomass) of 1,715.5 kg/year for the mitigation project may be removed because the monitoring required to assess the biological performance standard would likely be counter-productive to the goal for the mitigation. By contrast, evaluating mitigation performance through comparison with appropriate reference sites is much less intrusive in comparison;
- 2) Poseidon's restoration mitigation project (Otay River Estuary Restoration Project (ORERP)), if successful, should adequately compensate for the projected mortality of all forms of marine life with respect to the intake related impacts under stand-alone operation; and
- 3) Poseidon's evaluation of intake and mortality of marine life in the design alternatives was adequate in consideration of current data constraints. Further monitoring of the new intake system for permanent stand-alone operation is recommended⁶.

The SAP's final report with recommendations is available on the San Diego Water Board website at:

https://www.waterboards.ca.gov/sandiego/water_issues/programs/regulatory/docs/SAP/Poseidon_Carlsbad_SAP_report.pdf (as of November 14, 2018)

The San Diego Water Board conducted a Water Code section 13142.5(b) analysis of permanent stand-alone operations at the Facility in accordance with Ocean Plan chapter III.M. In conducting the analysis, the San Diego Water Board independently reviewed the record for development of this Order, including the ROWD and all supplemental documents, and the SAP recommendations. The San Diego Water Board evaluated a range of feasible alternatives for the best available site, design, technology, and mitigation measures to minimize intake and mortality of all forms of marine life and determined the best combination of feasible alternatives to minimize intake and mortality of all forms of marine life. The San Diego Water Board has determined that Design Alternative 21 provides the best available site, design, technology, and mitigation measures feasible to minimize the intake and mortality of all forms of marine life while taking into account construction, operation, and maintenance costs.

Table H-2 below and Attachment H.2 of this Order set forth the San Diego Water Board's considerations of the feasible alternatives evaluated and describes the San Diego Water Board's conclusion that Design Alternative 21 represents the best combination of feasible alternatives to minimize intake and mortality of all forms of marine life.

⁵ The San Diego Water Board topics for SAP review is available on the Board's website at https://www.waterboards.ca.gov/sandiego/water_issues/programs/regulatory/docs/SAP/2018-01-24_Final_Topics_for_3rd_party.pdf (as of November 14, 2018)

⁶ Section VI.C.2.a. of the Order requires a Brine Discharge Technology Empirical Study that will assess the impacts from the new intake system withdrawing seawater to provide flow-augmentation dilution of the brine discharge.

Table H-2: Water Code Section 13142.5(b) Determination

Finding No.	Ocean Plan, chapter III.M Reference	Ocean Plan Requirement	Finding
-	2.a	Water Code section 13142.5(b) Determinations for New and Expanded Facilities: Site, Design, Technology, and Mitigation Measures Feasibility Considerations. General Considerations:	
1	2.a(1)	The owner or operator shall submit a request for a Water Code section 13142.5(b) determination to the appropriate regional water board as early as practicable. This request shall include sufficient information for the regional water board to conduct the analyses described below. The regional water board in consultation with the State Water Board staff may require an owner or operator to provide additional studies or information if needed, including any information necessary to identify and assess other potential sources of mortality to all forms of marine life. All studies and models are subject to the approval of the regional water board in consultation with State Water Board staff. The regional water board may require an owner or operator to hire a neutral third-party entity to review studies and models and make recommendations to the regional water board.	<p>On September 4, 2015, Poseidon as the owner and operator of the Facility submitted with the ROWD, a request for a Water Code section 13142.5(b) determination for permanent stand-alone operating conditions. The San Diego Water Board in consultation with the State Water Board reviewed the request and all supporting appendices. During that review, additional information was provided by Poseidon including revised dilution studies and further investigation of various intake configuration alternatives. The ROWD and appendices are available on the San Diego Water Board's website at: https://www.waterboards.ca.gov/sandiego/water_issues/programs/regulatory/carlsbad_desalination_appendices.html (as of June 25, 2018)</p> <p>The San Diego Water Board required Poseidon to hire a neutral third party to review studies and models and make recommendations to the San Diego Water Board for the reissuance of Poseidon's NPDES permit for permanent stand-alone operations of the Facility. Following discussions with Poseidon, a previously established SAP overseen by the Coastal Commission was chosen to review three topics pertaining to the permit reissuance:</p> <ol style="list-style-type: none"> 1) Removing the biological performance standard for mitigation; 2) Mitigating for mortality to all forms of marine life; and

Finding No.	Ocean Plan, chapter III.M Reference	Ocean Plan Requirement	Finding
			<p>3) Comparing intake and mortality of all forms of marine life associated with different intake screen locations.</p> <p>The SAP recommendations in summary are:</p> <ol style="list-style-type: none"> 1) The San Diego Water Board's biological performance standard of fish productivity (i.e the production of new fish biomass) of 1,715.5 kg/year for the mitigation project may be removed because the monitoring required to assess the biological performance standard would likely be counter-productive to the goal for the mitigation. By contrast, evaluating mitigation performance through comparison with appropriate reference sites is much less intrusive; 2) Poseidon's restoration mitigation project should be adequate compensation with respect to intake related impacts under stand-alone operation if it is successful; and 3) Poseidon's evaluation of intake and mortality of marine life in the design alternatives was adequate in consideration of current data constraints. Further monitoring of the new intake system for permanent stand-alone operation is recommended. <p>The SAP's full report with recommendations was available starting June 25, 2018 the San Diego Water Board's website: https://www.waterboards.ca.gov/sandiego/water_issues/programs/regulatory/docs/SAP/Poseidon_Carlsbad_SAP_report.pdf</p>

H.1-8

Finding No.	Ocean Plan, chapter III.M Reference	Ocean Plan Requirement	Finding
2	2.a(2)	<p>The regional water board shall conduct a Water Code section 13142.5(b) analysis of all new and expanded desalination facilities. A Water Code section 13142.5(b) analysis may include future expansions at the facility. The regional water board shall first analyze separately as independent considerations a range of feasible alternatives for the best available site, the best available design, the best available technology, and the best available mitigation measures to minimize intake and mortality of all forms of marine life. Then, the regional water board shall consider all four factors collectively and determine the best combination of feasible alternatives to minimize intake and mortality of all forms of marine life. The best combination of alternatives may not always include the best alternative under each individual factor because some alternatives may be mutually exclusive, redundant, or not feasible in combination.</p>	<p>The San Diego Water Board conducted a Water Code section 13142.5(b) analysis of the Facility. In doing so, the San Diego Water Board analyzed separately as independent considerations a range of feasible alternatives for the best available site, best available design, the best available technology, and the best available mitigation measures to minimize intake and mortality of all forms of marine life.</p> <p>The San Diego Water Board also analyzed and considered all four factors collectively to determine the best combination of feasible alternatives to minimize intake and mortality of all forms of marine life.</p> <p>This table and Attachment H.2 summarize the San Diego Water Board's analysis and findings for the separate and combined considerations of various feasible alternatives for the Water Code section 13142.5(b) determination.</p>
3	2.a(3)	<p>The regional water board's Water Code section 13142.5(b) analysis for expanded facilities may be limited to those expansions or other changes that result in the increased intake or mortality of all forms of marine life, unless the regional water board determines that additional measures that minimize intake and mortality of all forms of marine life are feasible for the existing portions of the facility.</p>	<p>The San Diego Water Board's Water Code section 13142.5(b) analysis was not limited to the Facility expansions or other changes that result in increased intake or mortality of all forms of marine life.</p> <p>The 2009 Determination was limited in scope to co-located and temporary stand-alone operations of the Facility with the EPS. Finding 52 of the 2009 Determination states: "Implementation of the March 27, 2009 Minimization Plan will ensure that the CDP is in compliance with Water Code section 13142.5(b) under co-location operations to benefit the CDP."</p> <p>The new Water Code section 13142.5(b) determination for this Order is for permanent stand-alone operations of the</p>

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			Facility upon termination of power-generating activities at EPS. As such, the Facility requires a Water Code section 13142.5(b) determination for permanent stand-alone operation and not just for those expansions or other changes that result in increased intake or mortality of all forms of marine life.
4	2.a(4)	In conducting the Water Code section 13142.5(b) determination, the regional water boards shall consult with other state agencies involved in the permitting of that facility, including, but not limited to: California Coastal Commission, California State Lands Commission, and California Department of Fish and Wildlife. The regional water board shall consider project-specific decisions made by other state agencies; however, the regional water board is not limited to project-specific requirements set forth by other agencies and may include additional requirements in a Water Code section 13142.5(b) determination.	In conducting the Water Code section 13142.5(b) determination, the San Diego Water Board consulted with, the Coastal Commission, the California State Lands Commission, and the California Department of Fish and Wildlife.
5	2.a(5)	A regional water board may expressly condition a Water Code section 13142.5(b) determination based on the expectation of the occurrence of a future event. Such future events may include, but are not limited to, the permanent shutdown of a co-located power plant with intake structures shared with the desalination facility, or a reduction in the volume of wastewater available for the dilution of brine. The regional water board must make a new Water Code section 13142.5(b) determination if the foreseeable future event occurs.	<p>The 2009 Determination was conditioned on the expectation of the permanent termination of the co-located operations.</p> <p>Finding 4 of the 2009 Determination states “If EPS permanently ceases operations and the Discharger proposes to independently operate the existing EPS seawater intake and outfall for the benefit of the CDP (“standalone operation”), it will be necessary to evaluate whether, under those conditions, the CDP complies with the requirements of Water Code section 13142.5(b). Additional review will be necessary in part because under stand-alone operations, the Discharger will have more flexibility in how it operates the intake structure and outfall and additional and/or better design and technology features may be feasible. The Discharger will be required</p>

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			<p>to submit a new Report of Waste Discharge to the Regional Board for authorization to operate in stand-alone mode, and shall seek review under Water Code section 13142.5(b) for such stand-alone operation, with permanent shut down of the EPS facility, within 90 days after EPS provides written notice to the California Independent System Operator of its intent to shutdown permanently all of its generating units.”</p> <p>The San Diego Water Board has conducted this new Water Code section 13142.5(b) determination as required in conformance with Finding 9 of the 2009 Determination and the information on which the finding was based and as required by the Ocean Plan to evaluate the best site, design, technology, and mitigation measures feasible to minimize the intake and mortality of marine life during permanent stand-alone operations of the Facility.</p>
6	2.a(5)(a)	The owner or operator shall provide notice to the regional water board as soon as it becomes aware that the expected future event will occur, and shall submit a new request for a Water Code section 13142.5(b) determination to the regional water board at least one year prior to the event occurring. If the owner or operator does not become aware that the event will occur at least one year prior to the event occurring, the owner or operator shall submit the request as soon as possible.	The EPS is permanently ceased power generating operations as of December 11, 2018 and Poseidon requested a new Water Code section 13142.5(b) determination on September 4, 2015.
7	2.(a)(5)(b)	The regional water board may allow up to five years from the date of the event for the owner or operator to make modifications to the facility required by a new Water Code section 13142.5(b) determination, provided that the regional water board finds that 1) any water supply interruption resulting from the facility modifications requires additional time for water users to obtain a temporary	In accordance with chapter III.M.2.(a)(5)(b) of the Ocean Plan, the Order includes a compliance schedule at section VI.C.9 which provides Poseidon up to five years from the date EPS permanently ceased power generating operations to secure permits, complete design, and construct a new intake structure that supports stand-alone operation of the Facility while maintaining compliance with

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		replacement supply, or 2) such a compliance period is otherwise in the public interest and reasonably required for modification of the facility to comply with the determination.	the Ocean Plan. This compliance period to modify the intake technology as required by this Water Code section 13142.5(b) determination is in the public interest to maintain Facility operations and continue drinking water production at the Facility during that time when the EPS has permanently ceased power generating operations prior to the construction of a new intake structure, according to the schedule provided by Poseidon on September 13, 2018. The five-year compliance schedule reflects a realistic assessment of the time needed to design, obtain necessary permits for, construct and put into operation a new intake structure within the waters of Agua Hedionda Lagoon.
8	2.(a)(5)(c)	If the regional water board makes a Water Code section 13142.5(b) determination for a desalination facility that will be co-located with a power plant, the regional water board shall condition its determination on the power plant remaining in compliance with the Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling.	This Water Code section 13142.5(b) determination is for permanent stand-alone operations of the Facility. Because EPS has ceased power generation operations and CDP is no longer co-located with EPS, the provision requiring power plant compliance with the <i>Statewide Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling (Once-Through Cooling Policy)</i> does not apply.
-	2.b	Site Location: The Site is the general onshore and offshore location of a new or expanded facility. There may be multiple potential facility design configurations within any given site. For each potential site, in order to determine whether a proposed facility site is the best available site feasible to minimize intake and mortality of all forms of marine life, the regional water board shall require the owner or operator to:	
9	2.b(1)	Consider whether subsurface intakes are feasible.	The San Diego Water Board previously considered the feasibility of various intake configurations (beach wells, slant wells, horizontal wells, offshore subsurface infiltration galleries, and the existing EPS intake) in the 2009 Determination for the CDP, including the applicability of subsurface intake technology, and found that subsurface intakes were not feasible at that time. In support of the

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			<p>2009 Determination the San Diego Water Board concluded that Poseidon analyzed the following intake alternatives: (1) Subsurface intake (vertical and horizontal beach wells, slant wells, and infiltration galleries); (2) new open ocean intake; (3) Modifications to the existing power plant intake system; and (4) Installation of variable frequency drives (VFDs) on seawater intake pumps.” (see Finding 9 of the 2009 Determination). The San Diego Water Board also concluded that the proposed technology [surface water intakes with flow-augmentation discharge] for the CDP is the best available technology feasible under co-location operation for the CDP benefit (see Findings 35-39 of the 2009 Determination)</p> <p>Following Poseidon’s September 4, 2015 request for a new Water Code section 13142.5(b) determination for stand-alone operation of the Facility, the San Diego Water Board independently re-evaluated the feasibility of subsurface intakes for the Water Code section 13142.5(b) determination under this Order. Poseidon conducted a hydrogeological study of the subsurface conditions in the vicinity of the CDP, which concluded that subsurface intakes were not feasible because of limited water production capacity of the subsurface geological formation, poor water quality (high salinity and turbidity) of collected source water, cost, and environmental considerations (i.e., construction impacts, operational impacts, and aesthetics). The San Diego Water Board has considered the findings of the 2009 Determination for the Water Code section 13142.5(b) determination under this Order and the information on which the findings were based and concluded that oceanographic geologic, hydrogeologic, and seafloor conditions have not changed since the 2009 Determination such that subsurface intakes would now be feasible. The cost for relocating the CDP to an alternate</p>

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			<p>site where sub-surface intakes are technically feasible would be economically infeasible.</p> <p>The City of Carlsbad's Final Environmental Impact Report (EIR)¹ and the Coastal Commission's Coastal Development Permit² also concluded that beach wells, slant wells, horizontal wells, and offshore seafloor infiltration galleries were not feasible. See Appendices Q and AA to the ROWD.</p> <p>Poseidon also explored the feasibility of two additional subsurface intake alternatives for the Facility: (1) a seafloor infiltration gallery (SIG) located in Agua Hedionda Lagoon coupled with an ocean outfall diffuser and (2) a lagoon-based SIG coupled with flow augmentation using the existing EPS intake and an ocean outfall. Poseidon has estimated a total project cost of \$679 million and a total annual cost, including operating costs, of \$94 million to implement a SIG with a multiport diffuser. Poseidon has estimated a total project cost of \$1,038 million and a total annual cost, including operating costs, of \$159 million to implement a SIG with Flow Augmentation. See Appendices B, O, and II to the ROWD.</p> <p>Based on the findings in the 2009 Determination and the information provided by Poseidon in the ROWD, the San Diego Water Board has concluded that subsurface intakes are not feasible at this time. The conclusion that subsurface intakes are not feasible is consistent with the findings of the SDCWA's Final Supplemental EIR (SEIR), dated August 2016 contained in Appendix KK to the ROWD, and the Coastal Commission's Coastal Commission's Coastal Development Permit².</p> <p>¹ See <i>Precise Development Plan and Desalination Plant Project, Final Environmental Impact Report (EIR 03-05)</i>,</p>

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			<p><i>City of Carlsbad, California, SCH# 200404108, FEIR Certified June 13, 2006</i> The FEIR is available at this website: http://www.carlsbaddesal.com/eir.html (as of June 25, 2018).</p> <p>² The Coastal Commission's Coastal Development Permit is available at this website: https://www.waterboards.ca.gov/sandiego/water_issues/programs/regulatory/docs/appendices/Appendix_AA.pdf (as of June 25, 2018).</p>
10	2.b(2)	<p>Consider whether the identified need for desalinated water is consistent with an applicable adopted urban water management plan prepared in accordance with Water Code section 10631, or if no urban water management plan is available, other water planning documents such as a county general plan or integrated regional water management plan.</p>	<p>A fundamental objective of the Facility is its contribution of desalinated seawater as a component of meeting regional water supply planning goals. The SDCWA's <i>2015 Urban Water Management Plan</i> (UWMP)¹ contains a water supply reliability assessment which states that development of a diversified mix of water resources including surface water, groundwater, recycled water, potable reuse and desalinated seawater, is needed over the next 25 years to meet the region's existing and future water demands. The UWMP identifies the Facility as providing a long-term, reliable, drought-resistant water supply for the San Diego Region. The UWMP describes the additional annual average potable water output potentially resulting from the proposed CDP modifications as an adaptive management supply that could be used to meet projected regional growth and water demands. Accordingly, the identified need for desalinated water is consistent with an applicable adopted urban water management plan.</p> <p>¹ SDCWA's 2015 UWMP is available at this website: https://www.sdcwa.org/urban-water-management-plan (as of June 25, 2018)</p>

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11	2.b(3)	Analyze the feasibility of placing intake, discharge, and other facility infrastructure in a location that avoids impacts to sensitive habitats and sensitive species.	<p>Poseidon analyzed the feasibility of locating the Facility intake, discharge, and other facility infrastructure in a location that avoids impacts to sensitive habitats and sensitive species. See <u>Appendix A to the ROWD</u>.</p> <p>Of the 21 design alternatives proposed, Poseidon initially identified Design Alternatives 1 and 15 as “preferred alternatives.” Both of Poseidon’s previously preferred design alternatives make use of the existing EPS intake bar racks and tunnels with new intake pumps and new 1-mm screens located on-shore and within the intake structure, rather than screens located in or at the interface of the Agua Hedionda Lagoon. Recommendation, Condition, and Finding (RCF) number 21 in <u>Appendix A to the ROWD</u> explains Poseidon’s reasoning regarding their preferred location for the on-shore intake screens using the existing EPS intake structure. Appendix A also states that the continued use of the EPS intake would a) avoid impacts because no significant construction would be required in the lagoon and b) avoid impacts to pelagic fishes commonly reported in the nearshore water-column habitat.</p> <p>Following extensive meetings with the San Diego Water Board and the State Water Board, Poseidon stated in a letter dated October 22, 2018 that the SDCWA and Poseidon have concluded that Design Alternative 21 which would locate 1-mm wedgewire screens within Agua Hedionda Lagoon is best suited to comply with the requirements of the Ocean Plan and propose to implement Design Alternative 21.</p> <p>Agua Hedionda Lagoon is habitat for the marine species garibaldi, <i>Hypsypops rubicundus</i>. Although garibaldi is not an endangered species, there is concern that commercial collection by the saltwater aquarium industry has reduced</p>

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			<p>its numbers. In 1995, the California Legislature acted to protect the garibaldi by placing a moratorium on commercial collection and designating garibaldi as the official State Marine Fish of California, under CDFW fishery regulations. Agua Hedionda Lagoon's artificial rocky shoreline provides spawning grounds for garibaldi.</p> <p>Few adult garibaldi were surveyed in the 2008 Cabrillo Power I LLC EPS Clean Water Act Section 316(b) impingement mortality and entrainment characterization study (2008 EPS Study)¹. The 2008 EPS Study counted only 5 garibaldi individuals impinged during the year of sampling. However, the probability of mortality by entrainment for the garibaldi larval population in the lagoon was found to be 14.2 percent with an estimated annual 29,287,646 larval fish entrained per year. The 2008 EPS study states:</p> <p><i>"quantitative observations of garibaldi in the Outer Lagoon ... during August 2005 recorded densities of 7 fish per 30 m x 2 m transect along the North Jetty, 2 fish per transect in front of the EPS intake, and 1 per transect along the east channel leading into the Middle Lagoon. Based on the distribution of hard substrate in the lagoon, it would not be an overestimate to conclude that several hundred garibaldi could be present in [Agua Hedionda Lagoon], especially during the peak of breeding season in June and July."</i></p> <p>The San Diego Water Board has determined that wedge-wire screens (WWS) must be used to minimize impingement and avoid entrapment of garibaldi and other fish. As explained in the <i>Final Staff Report Including the Final Substitute Environmental Documentation for the Final Desalination Amendment</i>² (Desalination Amendment Staff</p>

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			<p>Report), wedge-wire technology reduces impingement, entrainment, and entrapment of aquatic life by:</p> <ul style="list-style-type: none"> • Acting as a physical barrier to prevent aquatic organisms sufficiently larger than the screen slot size (1 mm) from being entrained; • Using sweeping currents in the source water to move aquatic organisms past the screen faces; and • Utilizing a fine-mesh cylindrical wedgewire for the screens can further reduce entrainment of juvenile and adult stage of aquatic organisms. <p>Additionally, to minimize entrainment of larvae, the intake screens should be located at point of water withdrawal in the lagoon and the flow-through velocity of the screens should be minimized.</p> <p>The San Diego Water Board has concluded that Design Alternative 21 is the best alternative to avoid impacts to sensitive habitats and species. Design Alternative 21 is located within Agua Hedionda Lagoon's outer pond. This design avoids the rocky shoreline habitat by locating the screens on the sandy seafloor in the interior of the lagoon. The intake laterals may be covered with natural sediments to restore habitat impacts. Design Alternative 21 also employs WWS while maintaining the Ocean Plan's 0.5 ft/sec or less through-screen velocity standard, minimizing entrainment and impingent; and avoiding entrapment of marine life.</p> <p>Further analysis of the intake and discharge alternatives is provided in Attachment H.2 of this Order to comparatively demonstrate that Design Alternative 21 is the best alternative to minimize marine life mortality. Design</p>

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			<p>Alternative 21 is described in <u>Appendices DDD and EEE to the ROWD</u>.</p> <p>The San Diego Water Board has also concluded that the Facility's current discharge location and proposed brine mixing zone (BMZ) avoid impacts to sensitive habitats and species by using an existing discharge structure.</p> <p>Additional information regarding the proposed design alternatives and the impacts associated with impingement and entrainment from the intake of seawater is contained in <u>Appendices B, J, K, P, X, Y, EE, FF, GG, HH, II, PP, SS, TT, YY, ZZ, AAA, BBB, CCC, DDD, and EEE to the ROWD</u>.</p> <p>Additional information regarding the proposed discharge structure is contained in <u>Appendices C, G, H, I, K, X, Y, BB, CC, DD, PP, QQ, RR, TT, UU, VV, WW, XX, and ZZ to the ROWD</u>.</p> <p>¹The 2008 EPS Study is available at this website: https://www.waterboards.ca.gov/water_issues/programs/ocean/cwa316/powerplants/encina/docs/eps_ip2011att1_i_mec.pdf (as of June 25, 2018).</p> <p>²The Desalination Amendment Staff Report is available on the State Water Board website at: https://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2015/rs2015_0033_sr_apx.pdf (as of June 25, 2018).</p>
12	2.b(4)	Analyze the direct and indirect effects on all forms of marine life resulting from facility construction and operation, individually and in combination with potential anthropogenic effects on all forms of marine life resulting	Poseidon analyzed and summarized the direct and indirect effects on all forms of marine life resulting from the proposed alternatives for the Facility. See <u>Appendices A, YY, ZZ, BBB, CCC to the ROWD</u> .

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		from other past, present, and reasonably foreseeable future activities within the area affected by the facility.	<p>Based on the information provided by Poseidon, the San Diego Water Board has also concluded that the intake structure alternative in Design Alternative 21 will most effectively minimize or avoid direct and indirect effects on all forms of marine life resulting from facility construction and operation, individually and in combination with potential anthropogenic effects on all forms of marine life resulting from other past, present, and reasonably foreseeable future activities within the area affected by the Facility. Further analysis and comparison of the intake and discharge alternatives in support of this conclusion is provided in Attachment H.2 of this Order.</p> <p>Although the construction of Design Alternative 21 may have greater temporary impacts to the benthic habitat within Agua Hedionda Lagoon when compared to some of the other proposed intake alternatives, the permanent impact of approximately 0.2 acres of benthic habitat is less than or similar to the permanent benthic impacts of other alternatives considered and also avoids long-term, continuous impacts to marine life caused by the other intake alternatives that rely on an onshore intake structure. Temporary impacts from the intake laterals can be addressed by restoring natural sediment after construction. Other intake alternatives, such as Design Alternatives 1 and 15, may cause entrapment and impacts associated with a fish return system because they rely on an intake structure located at the shoreline of Agua Hedionda Lagoon. Other intake alternatives at the shoreline, such as Design Alternatives 11 through 14, could potentially remove the rocky shoreline suitable for garibaldi habitat. Additionally, the benthic habitat quality in Agua Hedionda Lagoon is periodically subject to disturbance caused by maintenance dredging conducted within the lagoon to maintain the intake channel for the EPS. Design</p>

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			<p>Alternative 21 may not require the same extent of lagoon dredging as the other intake alternatives.</p> <p>Further analysis and comparison of the intake and discharge alternatives is provided in Attachment H.2 of this Order.</p>
13	2.b(5)	<p>Analyze oceanographic geologic, hydrogeologic, and seafloor topographic conditions at the site, so that the siting of a facility, including the intakes and discharges, minimizes the intake and mortality of all forms of marine life.</p>	<p>The San Diego Water Board considered the feasibility of various intake configurations (beach wells, slant wells, horizontal wells, offshore subsurface infiltration galleries, and the existing EPS intake) in the 2009 Determination for the CDP, including the applicability of subsurface intake technology, and found that subsurface intakes were not feasible at that time due to limited production capacity of the subsurface geological formation, poor water quality of collected source water, excessive cost, and environmental considerations.</p> <p>In the 2009 Determination, the San Diego Water Board considered several alternative seawater intake, discharge, screening, and treatment technologies prior to selecting the desalination plant intake, screening, and seawater treatment technologies planned for the CDP. When economic, environmental and technological factors are considered, the improved power plant intake screening alternatives were not capable of being accomplished in a successful manner within a reasonable period of time. (see Finding 34 of the 2009 Determination)</p> <p>The San Diego Water Board also concluded in support of the 2009 Determination that Poseidon analyzed the following intake alternatives: (1) Subsurface intake (vertical and horizontal beach wells, slant wells, and infiltration galleries); (2) new open ocean intake; (3) Modifications to the existing power plant intake system; and (4) Installation</p>

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			<p>of variable frequency drives (VFDs) on seawater intake pumps. (see Finding 35 of the 2009 Determination)</p> <p>The San Diego Water Board has considered and reevaluated the findings of the 2009 Determination for the Water Code section 13142.5(b) determination under this Order and the information on which the findings were based and concluded that oceanographic geologic, hydrogeologic, and seafloor conditions have not changed since the 2009 Determination such that subsurface intakes would now be feasible.</p> <p>Further analysis of the intake and discharge alternatives is provided in Attachment H.2. See Findings 9, 11, and 12 above, and <u>Appendices O, P, Q, R and AA to the ROWD.</u></p> <p>Poseidon analyzed the oceanographic, geological and hydrogeological conditions in Agua Hedionda Lagoon in <u>Appendices B, D, F, S, T, DD, II, PP, SS, YY, and ZZ to the ROWD.</u></p> <p>Poseidon analyzed the potential nearshore and offshore discharge effects in <u>Appendices B, C, G, H, I, K, L, S, BB, PP, UU, VV, WW, and XX to the ROWD.</u></p>

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14	2.b(6)	Analyze the presence of existing discharge infrastructure, and the availability of wastewater to dilute the facility's brine discharge.	<p>EPS discontinued power generating activities on December 11, 2018. The closest existing discharge infrastructure and source of treated wastewater for dilution is the Encina Ocean Outfall which is owned and operated by the Encina Wastewater Authority. The Encina Ocean Outfall (EOO) is located approximately two miles south of the CDP. According to the Encina Wastewater Authority, the EOO is near full capacity during large storm events, and future wastewater recycling will significantly reduce the availability of wastewater for diluting the brine discharge.</p> <p>Poseidon submitted studies regarding the potential use of EOO as a brine discharge alternative for the CDP as <u>Appendices B and CC to the ROWD</u>. These studies found that the use of wastewater was infeasible due to limited flow for dilution and limited capacity at any nearby existing wastewater outfalls.</p> <p>For these reasons, the San Diego Water Board has determined that discharging brine by commingling with wastewater from the EOO is infeasible at this time.</p> <p>Additional information regarding the feasibility of discharging brine to the EOO is provided in <u>Appendix RR to the ROWD</u>.</p>
15	2.b(7)	Ensure that the intake and discharge structures are not located within a Marine Protected Area (MPA) or State Water Quality Protection Areas (SWQPA) with the exception of intake structures that do not have marine life mortality associated with the construction, operation, and maintenance of the intake structures (e.g. slant wells). Discharges shall be sited at a sufficient distance from a MPA or SWQPA so that the salinity within the boundaries of a MPA or SWQPA does not exceed natural background	<p>The nearest MPA or SWQPA is Batiquitos Lagoon, approximately five miles south of the Facility. Batiquitos Lagoon is a MPA, specifically a State Marine Conservation Area, with a no-take regulation by the CDFW¹. As noted in <u>Appendix C, BB, and QQ to the ROWD</u>, the intake and discharge is sited at a sufficient distance from a MPA or SWQPA so that the salinity within the boundaries of a MPA or SWQPA does not exceed natural background salinity. In addition, based upon the models and studies that</p>

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		salinity. To the extent feasible, surface intakes shall be sited so as to maximize the distance from a MPA or SWQPA.	<p>Poseidon submitted, the San Diego Water Board finds that CDP's brine discharge will not exceed 2.0 ppt above natural background salinity outside the BMZ, the edge of which is at least five miles from Batiquitos Lagoon. (See Finding 18 of this Attachment H.1 and further analysis of the discharge alternatives in Attachment H.2 of this Order.)</p> <p>Accordingly, the San Diego Water Board finds that the discharge is sited at a sufficient distance from a MPA or SWQPA so that the salinity within the boundaries of a MPA or SWQPA does not exceed natural background salinity.</p> <p>¹More information regarding Batiquitos Lagoon designation as a MPA is provided at this website: https://www.wildlife.ca.gov/conservation/marine/mpas/network/southern-california#27149500-batiquitos-lagoon-state-marine-conservation-area (as of June 25, 2018)</p>
-	2.c	Design: Design is the size, layout, form, and function of a facility, including the intake capacity and the configuration and type of infrastructure, including intake and outfall structures. The regional water board shall require that the owner or operator perform the following in determining whether a proposed facility design is the best available design feasible to minimize intake and mortality of all forms of marine life:	
16	2.c(1)	For each potential site, analyze the potential design configurations of the intake, discharge, and other facility infrastructure to avoid impacts to sensitive habitats and sensitive species.	See Findings 9, 11, 12, 13, and 15 regarding the evaluation of the potential design configurations of intake and discharge structures. Further analysis of the intake and discharge alternatives is provided in Attachment H.2 of this Order.
17	2.c(2)	If the regional water board determines that subsurface intakes are not feasible and surface water intakes are proposed instead, analyze potential designs for those	See Finding 9 regarding the San Diego Water Board's 2009 Determination that subsurface intakes are not feasible. Based on the findings in the 2009 Determination and the information provided by Poseidon in the ROWD, the San Diego Water Board has concluded that subsurface

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		intakes in order to minimize the intake and mortality of all forms of marine life.	intake alternatives are not feasible at this time. This conclusion is consistent with the findings of the SDCWA's Final Supplemental EIR dated August 2016 contained in Appendix KK to the ROWD and consistent with the Coastal Commission's Coastal Development Permit in Appendix Q to the ROWD Poseidon's surface water intake alternatives analysis is provided in the <u>Appendices B, Q, AA, II, KK, PP, SS, YY, BBB, CCC, DDD, and EEE to the ROWD</u> . Further analysis of the intake and discharge alternatives is provided in Attachment H.2 of this Order.
18	2.c(3)	Design the outfall so that the BMZ does not encompass or otherwise adversely affect existing sensitive habitat.	See Findings 12, 13, 15, and 19 regarding the design of the outfall. Further analysis of the intake and discharge alternatives is provided in Attachment H.2 of this Order. Based on the referenced findings and the information provided in the ROWD, the San Diego Water Board finds that the outfall has been designed so that the BMZ does not encompass or otherwise adversely affect sensitive habitat. No kelp beds or permanently exposed natural rock outcrops exist within the BMZ.
19	2.c(4)	Design the outfall so that discharges do not result in dense, negatively buoyant plumes that result in adverse effects due to elevated salinity or hypoxic conditions occurring outside the BMZ. An owner or operator must demonstrate that the outfall meets this requirement through plume modeling and/or field studies. Modeling and field studies shall be approved by the regional water board in consultation with State Water Board staff.	Based on information provided by Poseidon, the San Diego Water Board analyzed two outfall design alternatives following consideration of the availability of wastewater for dilution: 1) a multiport diffuser alternative and 2) a flow augmentation alternative. The information provided by Poseidon regarding the outfall design analysis is provided in <u>Appendices B, C, K, L, N, X, Y, BB, CC, DD, II, OO, PP, QQ, RR, UU, and VV to the ROWD</u> . The multiport diffuser alternative that the San Diego Water Board analyzed as modeled by Poseidon consisted of a 72-inch outfall pipe extending approximately 4,000 feet (ft.) offshore, which would convey the brine discharge from the

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			<p>Facility to a multiport diffuser system where four duckbill diffuser ports would eject the brine into the water column at a high velocity to promote rapid diffusion and dispersion. The diffusers were designed to promote rapid mixing to prevent the formation of negatively buoyant plumes. Under this scenario, the BMZ would be a circle with a radius of 100 meters (328 ft.), originating from each of the diffuser ports. The duckbill diffusers were spaced approximately 100 ft. apart. Outside of the BMZ, salinity would not exceed 2 parts per thousand (ppt) over ambient background salinity. Within the BMZ, entrained organisms would experience elevated salinity. The benthic area encompassed by the BMZ would be approximately 12.3 acres.</p> <p>The flow augmentation alternative modeled by Poseidon and analyzed by the San Diego Water Board consisted of commingling the brine discharge from the Facility in the existing EPS discharge channel with flow augmentation water from the Agua Hedionda Lagoon to initially dilute the brine to 42 ppt. Final dilution to comply with the receiving water limitation for salinity was accomplished through natural mixing in the surf zone. Under these conditions the BMZ would comprise an area slightly larger than a semicircle with a radius of 200 meters (656 ft.), originating from the end of the discharge jetty and continuing out to the ocean and circling back to the shoreline. The benthic area encompassed by the BMZ would be approximately 18.51 acres. Poseidon concluded in <u>Appendix DD to the ROWD</u> that “hypoxic conditions are not present under existing operating conditions, and are not expected to be present outside the 200 meter (656 ft.) BMZ under the proposed operating conditions.”</p>

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			<p>In support of this application, Poseidon also submitted an entrainment study, based on Tenera Environmental's 2008 Encina Power Station Clean Water Act Section 316(b) Impingement Mortality and Entrainment Characterization Study, as Appendix K of the 2015 ROWD. Poseidon subsequently revised the entrainment effects calculations as recommended by the SAP and provided the results as Appendices FFF and GGG to the ROWD, which the San Diego Water Board has reviewed and analyzed. The Poseidon's entrainment effects study found that for this Facility, flow augmentation with a surface water intake would not result in adverse effects due to elevated salinity or hypoxic conditions occurring outside the BMZ. Poseidon also found that the use of wastewater was infeasible due to limited flow for dilution and limited capacity at any nearby existing wastewater outfalls</p> <p>In addition, Order No. R9-2006-0065 required extensive surf zone monitoring for dissolved oxygen. The results of this monitoring showed that the dissolved oxygen levels in ocean waters within the zone of initial dilution have met the Ocean Plan's dissolved oxygen water quality standards. The discharge of brine using flow-augmentation dilution technology has not resulted in hypoxic conditions.</p> <p>Accordingly, the San Diego Water Board finds that the outfall has been designed so that discharges do not result in dense, negatively buoyant plumes that result in adverse effects due to elevated salinity or hypoxic conditions occurring outside the BMZ.</p>
20	2.c(5)	Design outfall structures to minimize the suspension of benthic sediments.	<p>Both outfall structure alternatives have been designed to minimize the suspension of benthic sediments.</p> <p><u>As described in Attachment A to the ROWD</u>, a new multipoint diffuser discharge system would be located</p>

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			<p>approximately 4,000 ft. offshore, 3,280 ft. northwest of kelp beds. The diffuser system would be elevated off the seafloor and oriented to minimize the suspension of benthic sediments, in accordance with Ocean Plan provisions.</p> <p>As described in Attachment A to the ROWD, a flow-augmentation discharge system would flow by gravity into the existing EPS discharge channel following dilution to 42 ppt by flow-augmentation with additional seawater. Final dilution to comply with the receiving water limitation for salinity would be accomplished through natural mixing in the surf zone, thereby minimizing project-related suspension of benthic sediments.</p>
-	2.d	Technology: Technology is the type of equipment, materials, and methods that are used to construct and operate the design components of the desalination facility. The regional water board shall apply the following considerations in determining whether a proposed technology is the best available technology feasible to minimize intake and mortality of all forms of marine life:	
21	2.d(1)(a)(i)	The regional water board shall consider the following factors in determining feasibility of subsurface intakes: geotechnical data, hydrogeology, benthic topography, oceanographic conditions, presence of sensitive habitats, presence of sensitive species, energy use for the entire facility; design constraints (engineering, constructability), and project life cycle cost. Project life cycle cost shall be determined by evaluating the total cost of planning, design, land acquisition, construction, operations, maintenance, mitigation, equipment replacement and disposal over the lifetime of the facility, in addition to the cost of decommissioning the facility. Subsurface intakes shall not be determined to be economically infeasible solely because subsurface intakes may be more expensive than surface intakes. Subsurface intakes may be determined to be economically infeasible if the additional costs or lost	<p>The San Diego Water Board concludes, as it did in the 2009 Determination, that subsurface intakes are not feasible at this time. The same considerations now required by Ocean Plan Chapter III.M.2.d(1)(a)(i) were reviewed in the 2009 Determination and the information and conditions on which the findings were based, and those conditions have not changed since that time.</p> <p>See Findings 9 and 13 regarding geotechnical data, hydrogeology, benthic topography, oceanographic conditions, presence of sensitive habitats, and design constraints associated with subsurface intakes.</p> <p>See <u>Appendices N and OO to the ROWD</u> for information regarding life cycle costs for subsurface intakes.</p>

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		profitability associated with subsurface intakes, as compared to surface intakes, would render the desalination facility not economically viable. In addition, the regional water board may evaluate other site- and facility-specific factors.	Further analysis of the intake alternatives including subsurface intake alternatives is provided in Attachment H.2 of this Order.
22	2.d(1)(a)(ii)	If the regional water board determines that subsurface intakes are not feasible for the proposed intake design capacity, it shall determine whether subsurface intakes are feasible for a reasonable range of alternative intake design capacities. The regional water board may find that a combination of subsurface and surface intakes is the best feasible alternative to minimize intake and mortality of marine life and meet the identified need for desalinated water as described in chapter III.M.2.b.(2).	<p>The San Diego Water Board concluded in the 2009 Determination that subsurface intake alternatives were not feasible. The San Diego Water Board has reevaluated the feasibility of subsurface intakes for the Water Code section 13142.5(b) determination under this Order and finds that a combination of subsurface and surface intakes is not feasible at this time. A combination of a low-volume subsurface intake with a surface intake would be a very complex technical intake configuration with multiple pipelines, pumps, and infrastructure constructed on an already developed parcel of land with existing site constraints. The increased complexity and dual infrastructure needed for both a subsurface intake and surface water intake would be a cost multiplier on capital expenses, operation and maintenance, permitting, and other expenses associated with constructing a new intake system. These technical and economic considerations would render a combination of intake technologies to be infeasible.</p> <p>See Findings 9, 10, 11, 12, 13, 14, 15, and 21 regarding the feasibility of subsurface intakes for a range of alternative intake design capacities.</p>
23	2.d(1)(b)	Installation and maintenance of a subsurface intake shall avoid, to the maximum extent feasible, the disturbance of sensitive habitats and sensitive species.	<p>The San Diego Water Board concluded in the 2009 Determination that subsurface intake alternatives were not feasible.</p> <p>See Finding 9 for further discussion of the environmental effects of the SIG alternatives.</p>

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			See Finding 11 and 21 for further discussion on avoiding sensitive habitats and sensitive species. See <u>Appendices B, and II to the ROWD</u> for information regarding the potential impacts from subsurface intakes.
24	2.d(1)(c)	If subsurface intakes are not feasible, the regional water board may approve a surface water intake subject to the following conditions:	After analyzing Poseidon submittals regarding relevant geotechnical data, hydrogeology, benthic topography, oceanographic conditions, presence of sensitive habitats, presence of sensitive species, energy use for the entire facility, design constraints, and project life cycle costs, the San Diego Water finds that the surface intake configuration in Design Alternative 21 meets the requirements and conditions of chapter III.M.2.d.(1)(c) of the Ocean Plan. See Findings 25 through 28 for further discussion.
25	2.d(1)(c)i	The regional water board shall require that surface water intakes be screened. Screens must be functional while the facility is withdrawing seawater.	The Facility will be equipped with functioning screens while withdrawing seawater. See Finding 11 for more information. Further analysis of the intake and discharge alternatives is provided in Attachment H.2.
26	2.d(1)(c)ii	In order to reduce entrainment, all surface water intakes must be screened with a 1.0 mm (0.04 in) or smaller slot size screen when the desalination facility is withdrawing seawater.	The Facility's surface water intake will be screened with a 1.0 mm screen or smaller slot size screen. Design Alternative 21 complies with the 1.0 mm screening requirement and the 0.5 ft/sec or less through-screen velocity requirement. The 1.0 mm screening and the through-screen velocity standard set by the Ocean Plan minimizes the mortality to marine life due to impingement and entrainment. See <u>Appendices B, J, K, P, X, Y, EE, FF, GG, HH, II, PP, SS, TT, YY, ZZ, AAA, BBB, CCC, DDD, EEE, and FFF to the ROWD</u> . Further analysis of the intake and discharge alternatives is provided in Attachment H.2 of this Order.

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27	2.d.(1)(c)iii	An owner or operator may use an alternative method of preventing entrainment so long as the alternative method results in intake and mortality of eggs, larvae, and juvenile organisms that is less than or equivalent to a 1.0 mm (0.04 in) slot size screen. The owner or operator must demonstrate the effectiveness of the alternative method to the regional water board. The owner or operator must conduct a study to demonstrate the effectiveness of the alternative method, and use an Empirical Transport Model (ETM)/ Area of Production Forgone (APF) approach to estimate entrainment. The study period shall be at least 12 consecutive months. Sampling for environmental studies shall be designed to account for variation in oceanographic or hydrologic conditions and larval abundance and diversity such that abundance estimates are reasonably accurate. Samples must be collected using a mesh size no larger than 335 microns and individuals collected shall be identified to the lowest taxonomical level practicable. The ETM/APF analysis shall evaluate entrainment for a broad range of species, species morphologies, and sizes under the environmental and operational conditions that are representative of the entrained species and the conditions at the full-scale desalination facility. At their discretion, the regional water boards may permit the use of existing entrainment data to meet this requirement.	The Facility's surface water intake will be screened with a 1.0 mm screen or smaller slot size screen. See Finding 11 for more information.
28	2.d(1)(c)iv	In order to minimize impingement, through-screen velocity at the surface water intake shall not exceed 0.15 meters per second (0.5 feet per second, ft/sec).	Design Alternative 21 complies with the 0.5 ft/sec through-screen velocity requirement. The 0.5 ft/sec standard set by the Ocean Plan minimizes mortality to marine life due to impingement. Further analysis of the intake and discharge alternatives is provided in Attachment H.2 of this Order.
29	2.d(2)(a)	The preferred technology for minimizing intake and mortality of all forms of marine life resulting from brine discharge disposal is to commingle brine with wastewater	The San Diego Water Board finds that wastewater is unavailable to dilute the Facility's brine discharge. See Finding 14 for more information.

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		(e.g., agricultural, municipal, industrial, power plant cooling water, etc.) that would otherwise be discharged to the ocean. The wastewater must provide adequate dilution to ensure salinity of the commingled discharge meets the receiving water limitation for salinity in chapter III.M.3. Nothing in this section shall preclude future recycling of the wastewater.	
30	2.d(2)(b)	Multiport diffusers are the next best method for disposing of brine when the brine cannot be diluted by wastewater and when there are no live organisms in the discharge. Multiport diffusers shall be engineered to maximize dilution, minimize the size of the BMZ, minimize the suspension of benthic sediments, and minimize mortality of all forms of marine life.	<p>Poseidon projects that the total project cost for a multiport diffuser with a surface water intake is up to \$458,639,220 in Appendix OO to the ROWD, Table 1, Surface Screened Intake with Multiport Diffuser. Based on this projection, the San Diego Water Board finds that multiport diffusers are not feasible at this time.</p> <p>Appendices B, N, II, and OO to the ROWD provide more information regarding the cost of construction and operation of a multiport diffuser. Further analysis of the intake and discharge alternatives is provided in Attachment H.2 of this Order.</p>
31	2.d(2)(c)	Brine discharge disposal technologies other than wastewater dilution and multiport diffusers, such as flow augmentation, may be used if an owner or operator can demonstrate to the regional water board that the technology provides a comparable level of intake and mortality of all forms of marine life as wastewater dilution if wastewater is available, or multiport diffusers if wastewater is unavailable. The owner or operator must evaluate all of the individual and cumulative effects of the proposed alternative discharge method on the intake and mortality of all forms of marine life, including (where applicable); intake-related entrainment, osmotic stress, turbulence that occurs during water conveyance and mixing, and shearing stress at the point of discharge. When determining the intake and mortality associated with a brine discharge	The San Diego Water Board analyzed the information provided by Poseidon for marine life mortality due to a discharge from a theoretical multiport diffuser by calculating the required volume of water to dilute the discharge to meet the salinity receiving water limit. This volume was then multiplied by 0.23 (23%) to estimate the volume of water where shearing-related mortality occurs, as was reported by Foster et al ¹ and referenced in the <i>Final Staff Report Including the Final Substitute Environmental Documentation</i> (SED) ³ . Finally, an estimate of the size of the Brine Mixing Zone was calculated using modeling and a theoretical diffuser. This area is 12.3 acres according to Appendix A to the ROWD. This analysis shows that the flow augmentation discharge technology provides a comparable level of intake and mortality of all

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		disposal technology or combination of technologies, the regional water board shall require the owner or operator to use empirical studies or modeling to:	<p>forms of marine life as the theoretical multiport diffuser. See <u>Appendices A, K, WW, ZZ, FFF, and GGG to the ROWD.</u></p> <p>A recent scientific report¹ by Dr. Philip Roberts has refined the methods to calculate marine life mortality caused by a brine discharge through a diffuser. These refined methods include a process to systematically determine the best available diffuser design to minimize mortality and the size of the BMZ.</p> <p>San Diego Water Board staff analyzed potential diffuser designs using the methods in the most recent scientific report by Dr. Roberts has estimated that the shearing-related mortality from the best available diffuser design is comparable to Poseidon's estimate of the additional intake-related mortality from the flow-augmentation discharge technology. Specifically, a theoretical diffuser could be designed that would result in a volume of approximately 170 MGD exposed to shearing-related mortality and a potential BMZ that might be as low as 1 acre. Poseidon's estimate of mortality from using flow augmentation discharge technology includes a 171 MGD volume of intake-related mortality and a BMZ of approximately 18.5 acres. Poseidon conducted a similar analysis in Appendix GGG to the ROWD that concluded a diffuser could be designed that would result in approximately 170 MGD of shearing related mortality. The San Diego Water Board will further review Poseidon's assessment of the impacts due to a multiport diffuser as part of the Brine Discharge Technology Empirical Study required in section VI.C.2.a. of the Order.</p> <p>In <u>Appendix N to the ROWD</u>, Poseidon estimated the cost to construct a multiport diffuser with a surface water intake to be approximately \$425 million. In Appendix EEE to the</p>

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			<p>ROWD, Poseidon estimated the cost to construct Design Alternative 21, a surface water intake with WWS using flow augmentation discharge technology, to be \$53 million. Poseidon's September 13, 2018 cost update for Alternative 21 put the expected cost of this alternative between \$66.2 to \$82.8 million.</p> <p>Based on the discussion above, the San Diego Water Board has determined that flow augmentation is the best available discharge technology feasible.</p> <p>Due to uncertainties in estimating the marine life mortality through modeling and as required by the Ocean Plan, Section VI.C.2.a.v. of this Order requires a special study to evaluate intake and mortality of all forms of marine life associated with the discharge technology for permanent stand-alone operations. This study will evaluate the marine life mortality from a flow-augmentation discharge with empirical observation data for direct comparison to the marine life mortality from a diffuser as outlined above.</p> <p>If the study shows that the flow-augmentation discharge technology results in more intake and mortality of all forms of marine life than a Facility using wastewater dilution or multiport diffusers, then the Facility must submit a proposed schedule to either:</p> <ol style="list-style-type: none"> 1. Cease using the flow-augmentation brine discharge technology and install and use wastewater dilution or multiport diffusers to discharge brine waste; or 2. Re-design the alternative flow-augmentation discharge technology system to minimize intake and mortality of all forms of marine life to a level that is comparable with wastewater dilution if wastewater is available, or

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			<p>multiport diffusers if wastewater is unavailable, subject to San Diego Water Board approval.</p> <p>¹Desalination Plant Entrainment Impacts and Mitigation. Expert Review Panel III, Foster et al, 2013 available at: https://www.waterboards.ca.gov/water_issues/programs/ocean/desalination/docs/erp_final.pdf (as of June 25, 2018)</p> <p>²Brine Diffusers and Shear Mortality, Philip J.W. Roberts, April 18, 2018 is available at the Santa Ana Water Board's website: https://www.waterboards.ca.gov/santaana/water_issues/programs/Wastewater/Poseidon/2018/4-18-18_Diffuser_Analysis_Method.pdf (as of June 25, 2018)</p> <p>³The Final Staff Report Including the Final Substitute Environmental Documentation is available at: https://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2015/rs2015_0033_sr_apx.pdf (Roberts' report)</p>
32	2.d(2)(c)i	Estimate intake entrainment impacts using an ETM/APF approach.	<p>Poseidon estimated the intake entrainment impacts from flow augmentation using an ETM/APF approach based on Appendix E to the Desalination Amendment Staff Report. The SAP reviewed Poseidon's APF and ETM calculations and recommended that the ETM calculations be consistent with the calculations conducted for the 2008 EPS Study, to account for the intake of marine life species from multiple source water bodies (i.e. Agua Hedionda Lagoon and the Pacific Ocean) rather than a single source water body (i.e. only Pacific Ocean). Poseidon revised the ETM calculations as recommended by the SAP and provided the results as Appendix FFF to the ROWD. See Finding 31 and Appendices K, P, WW, FFF, and GGG to the ROWD. The San Diego Water Board evaluated this information in</p>

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			reaching its conclusion that flow augmentation is the best available discharge technology feasible.
33	2.d(2)(c)ii	Estimate degradation of all forms of marine life from elevated salinity within the BMZ, including osmotic stresses, the size of impacted area, and the duration that all forms of marine life are exposed to the toxic conditions. Considerations shall be given to the most sensitive species, and community structure and function.	<p>Poseidon analyzed the potential for degradation to marine life due to elevated salinity within the BMZ. See <u>Appendices C, G, H, I, L, BB, DD, QQ, UU, WW, XX and ZZ to the ROWD</u>. The San Diego Water Board evaluated this information in reaching its conclusion that flow augmentation is the best available discharge technology feasible at this time.</p> <p>This Order's Monitoring Reporting Program in Attachment E requires salinity monitoring within the BMZ to assess impacts and evaluate adverse changes in the environment due to elevated salinity.</p>
34	2.d(2)(c)iii	Estimate the intake and mortality of all forms of marine life that occurs as a result of water conveyance, in-plant turbulence or mixing, and waste discharge.	<p>Poseidon estimated the intake and mortality of all forms of marine life that occurs as a result of water conveyance assuming 100 percent mortality of marine life entrained in the intake water. See Findings 31 and 32 and <u>Appendices B, C, F, K, I, J, L, BB, DD, GG, HH, QQ, UU, WW, XX YY, and ZZ to the ROWD</u>. The San Diego Water Board evaluated this information and concluded that flow augmentation is the best available discharge technology feasible at this time.</p>
35	2.d(2)(c)iv	Within 18 months of beginning operation, submit to the regional water board an empirical study that evaluates intake and mortality of all forms of marine life associated with the alternative brine discharge technology. The study must evaluate impacts caused by any augmented intake volume, intake and pump technology, water conveyance, waste brine mixing, and effluent discharge. Unless demonstrated otherwise, organisms entrained by the alternative brine discharge technology are assumed to have a mortality rate of 100 percent. The study period shall	<p>Section VI.C.2.a of this Order requires an empirical study to evaluate intake and mortality of all forms of marine life associated with the flow augmentation discharge. See Finding 31 for more information on the special study.</p>

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		be at least 12 consecutive months. If the regional water board requires a study period longer than 12 months, the final report must be submitted to the regional water board within 6 months of the completion of the empirical study.	
36	2.d(2)(c)v	If the empirical study shows that flow augmentation, the alternative brine discharge disposal technology, results in more intake and mortality of all forms of marine life than a facility using wastewater dilution or multiport diffusers, then the facility must either (1) cease using flow augmentation the alternative brine discharge technology and install and use wastewater dilution or multiport diffusers to discharge brine waste, or (2) re-design the flow augmentation the alternative brine discharge technology system to minimize intake and mortality of all forms of marine life to a level that is comparable with wastewater dilution if wastewater is available, or multiport diffusers if wastewater is unavailable, subject to regional water board approval.	<p>Section VI.C.2.a of this Order requires an empirical study to evaluate intake and mortality of all forms of marine life associated with the flow augmentation discharge. If the study shows that flow augmentation results in more intake and mortality than multiport diffusers, Poseidon may request a time schedule to comply with the requirement to cease or redesign the discharge technology.</p> <p>See Finding 31 for more information on the special study.</p>
37	2.d(2)(d)(ii)	<p>[Flow Augmentation as an alternative brine discharge technology is prohibited with the following exceptions:]</p> <p>At a facility that has received a conditional Water Code section 13142.5(b) determination and is over 80 percent constructed by January 28, 2016. If the owner or operator of the facility proposes proposing to use flow augmentation as an alternative brine discharge technology, the facility must: use low turbulence intakes (e.g., screw centrifugal pumps or axial flow pumps) and conveyance pipes; convey and mix dilution water in a manner that limits thermal stress, osmotic stress, turbulent shear stress, and other factors that could cause intake and mortality of all forms of marine life; comply with chapter III.M.2.d(1); and not discharge through multiport diffusers.</p>	<p>The San Diego Water Board finds that Facility meets the Ocean Plan's criteria for continued use of flow augmentation as an alternative brine discharge technology. The Facility received a conditional Water Code section 13142.5(b) determination in 2009 for co-located operations and temporary stand-alone operations (2009 Determination) and was over 80 percent constructed by January 28, 2016.</p> <p>Poseidon proposes to retrofit the Facility with a low turbulence intake (e.g., screw centrifugal pumps or axial flow pumps) and conveyance pipes. Additionally, the new pumps will convey and mix dilution water in a manner that limits thermal stress, osmotic stress, turbulent shear stress, and other factors that could cause intake and mortality of all forms of marine life. On this basis, the San Diego Water Board finds that the requirements of chapter</p>

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			III.M.2.d.(2)(d)(ii) have been satisfied. See Finding 31 and Appendices B, G, H, I, J, K, L, FFF, and GGG to the ROWD. Further analysis of the intake and discharge alternatives is provided in Attachment H.2 of this Order.
-	2.e	Mitigation: for the purposes of this section mitigation is the replacement of all forms of marine life or habitat that is lost due to the construction and operation of a desalination facility after minimizing intake and mortality of all forms of marine life through best available site, design, and technology. The regional water board shall ensure an owner or operator fully mitigates for the operational lifetime of the facility and uses the best available mitigation measures feasible to minimize intake and mortality of all forms of marine life. The owner or operator may choose whether to satisfy a facility's mitigation measures pursuant to chapter III.M.2.e.(3), or if available, M.2.e.(4), or a combination of the two.	
38	2.e(1)	Marine Life Mortality Report. The owner or operator of a facility shall submit a report to the regional water board estimating the marine life mortality resulting from construction and operation of the facility after implementation of the facility's required site, design, and technology measures.	Appendices A, B, II, and ZZ to the ROWD provide estimated impacts to all forms of marine life resulting from various intake and discharge alternatives under consideration for the Facility.
39	2.e(1)(a)	For operational mortality related to intakes, the report shall include a detailed entrainment study. The entrainment study period shall be at least 12 consecutive months and sampling shall be designed to account for variation in oceanographic or hydrologic conditions and larval abundance and diversity such that abundance estimates are reasonably accurate. At their discretion, the regional water boards may permit the use of existing entrainment data from the facility to meet this requirement. Samples must be collected using a mesh size no larger than 335 microns and individuals collected shall be identified to the lowest taxonomical level practicable. The ETM/APF analysis shall be representative of the entrained species collected using the 335 micron net. The APF shall be calculated using a one-sided, upper 95 percent confidence bound for the 95th percentile of the APF distribution. An owner or operator with subsurface intakes is not required	Poseidon submitted an entrainment study in <u>Appendix K to the ROWD</u> and a minimization plan in <u>Appendix P to the ROWD</u> that addresses this Ocean Plan requirement. <u>Appendices K and P</u> relied on data from the 2008 EPS Study. In support of the 2009 Determination for co-located operations, the 2008 EPS Study and other studies produced in support of Poseidon's permitting applications were reviewed by Dr. Peter Raimondi, an academic researcher with extensive experience evaluating entrainment studies on behalf of California state agencies, including the Coastal Commission and the San Diego Water Board. Dr. Raimondi reported that the 2008 EPS Study and Poseidon's use of the entrainment data for the CDP were consistent with the best available science (<u>see Appendix K to the ROWD</u>) and concluded that the study provided adequate data to determine the types and numbers of organisms that would be subject to